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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,708	01/12/2004	Mark R. Fernald	WEAT/0553	9757

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EXAMINER	
HUGHES, JAMES P	

ART UNIT	PAPER NUMBER
2883	

DATE MAILED: 09/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/755,708	FERNALD ET AL.	
	Examiner	Art Unit	
	James P. Hughes	2883	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 July 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21 and 23-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21 and 23-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 December 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *062006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on July 10, 2006 have been fully considered but they are not persuasive. Detailed rejections in light of the new amendments are found below.

Claim Objections

2. Claims 1-21 and 23-30 are objected to because the specification, while being enabling for an optical fiber, does not reasonably provide enablement for fiber having a core and a cladding. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to a cladding on the fiber of the invention commensurate in scope with these claims.

3. Claims 1-21 and 23-30 are objected to as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear if the applicant is attempting to claim that the fibers are spliced with their cores entirely coated by a cladding, or if a portion of the cladding has been removed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 13 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Walters (6,033,515) in view of Maas et al. (5,157,751). Walters teaches a method and apparatus for fusion splicing of an optical fiber (e.g. a first waveguide section) and large optical device (e.g. a second waveguide section), which has a much larger cross section than standard optical fibers. Walters teaches that the two optical comments (e.g. 16, and 14) are aligned along one axis and employing a split laser beam (e.g. the two laser beams 10) with an adjusted power level for such fusion splicing an optical fiber (14) to a large optical element (16) such as "a lens, filter, grating, prism, WDM device, or other such optical component to which it is desired to secure the optical fiber 14" (Col. 6, ll. 20-22). (See e.g. Col. 1, ll. 25-66, Col. 5, ll. 20 – Col. 6, ll. 25 and Fig. 1)

However, Walters does not explicitly teach that the optical fiber (14) comprises a core and cladding and that the second waveguide section may not necessary comprise an optical fiber. As it is notoriously well known in the art that optical fibers (including these joined together) may comprise a cladding, it would have been obvious to one of ordinary skill in the art at the time of the invention that the fiber in the invention of Walters may have a cladding. Similarly, it is notoriously well known in the art that it is common to align fiber cores during splicing – for example as taught by Maas et al. (5,157,751) in claim 4. Thus it would have been obvious to one or ordinary skill in the art at the time of the invention to align the cores of fibers during splicing and one would have been motivated to do so because it would provide an efficient connection between the fibers. One would have been motivated to employ a cladding to increase the efficiency of light transmission within the fiber.

Additionally, Walters does not explicitly teach splicing two optical fibers. Rather, Walters teaches a more general device that is capable of "fusion splicing an optical fiber (14) to a

large optical element (16) such as "a lens, filter, grating, prism, WDM device, or other such optical component to which it is desired to secure the optical fiber 14" (Col. 6, ll. 20-22). As splicing optical fibers is notoriously well known in the art – as taught for example, by Maas et al. (5,157,751) in claim 4 – it would have been obvious to one of ordinary skill in the art at the time of the invention to employ the invention of Walters to splice two optical fibers because as Walters teaches, the device of Walters may efficiently join large optical waveguide sections.

5. Claims 13 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapman et al. (2003/0223712) in view of Maas et al. (5,157,751). Chapman et al. (2003/0223712) teaches a method and apparatus for placing two optical fibers in at least two stages wherein the stages allow movement of the fibers relative to each other: aligning distal ends of two optical fibers (12 and 14), then cleaving the end of an optical fiber (12) with a first laser (16), next cleaving the end of a second fiber (14) with a second laser (18), and following, fusing the two fibers together with a third laser (22). (See e.g., paragraphs 16-21 and Fig. 3) Chapman further teaches that the third laser beam (26) may be split into multiple component beams via a splitter device (79) to impinge on the two fibers, thereby forming a fusion splice. It is additionally taught that the laser power maybe controlled by a feedback mechanism. (See e.g. paragraphs 16 - 25 and Fig. 3)

Chapman does not explicitly teach aligning the optical fiber cores prior to joining said fibers. However, as it is notoriously well known in the art that it is common to align fiber cores during splicing – for example as taught by Maas et al. (5,157,751) in claim 4; it would have been obvious to one or ordinary skill in the art at the time of the invention to align the cores of

fibers during splicing and one would have been motivated to do so because it would provide an efficient connection between the fibers.

6. Claims 1-3, 6, 7, 9, 12-18, and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapman et al. (2003/0223712) in view of in view of Maas et al. (5,157,751), in further view of Walters (6,033,515).

Chapman in view of Maas et al. (5,157,751) teaches a method and apparatus for splicing two optical fibers as discussed above. However, Chapman does not explicitly teach that at least one of the fibers has a diameter greater than 400 micrometers.

Walters in view of Maas et al. (5,157,751) teaches fusion splicing of fibers and large optical devices, which have a much larger cross section than standard optical fibers as discussed above.

Chapman teaches employing two laser sources for preparing an optical fiber for fusion splicing is advantageous because it allows a high reliability and control of the heat source (see e.g. p. 25). It would have been obvious to one of ordinary skill in the art at the time of invention to employ two beams to connect optical components – such as those with a 400 um and grater diameter – to each other as is taught by Walters in the method and device of Chapman to splice two larger (e.g. multimode) fibers or a single mode to a multimode fiber – e.g. optical waveguide sections with different and/or large cross-section diameters. One of ordinary skill in the art at the time of the invention would have been motivated to do so because the power output provided to the two fibers – of potentially different sizes – could be controlled more precisely, thus yielding an efficient splicing method and apparatus for large diameter waveguide sections.

7. Claims 1, 4, 5, 13, 20, 21, 27, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapman et al. (2003/0223712) in view of Maas et al. (5,157,751), in further view of Walters (6,033,515), in further view of Eskildsen et al. (2003/0108307).

Chapman et al. (2003/0223712) in view of Maas et al. (5,157,751), in further view of Walters (6,033,515), teaches a method and apparatus for fusion splicing optical fibers as discussed above.

Eskildsen et al. (2003/0108307) teaches an apparatus and method for aligning two fibers for fusion splicing and subsequently evaluating the loss of the resulting splice. Eskildesen teaches that a power monitoring may be accomplished automatically by transmitting optical power through the fibers and detecting the power after traversing the fusion splice. Following, the detected power may be used as a feedback signal to adjust the lateral position of the fibers. (See e.g. p. 13) Eskildsen also teaches that the loss of the resulting spliced fiber may be measured via similar methods. (See e.g. p. 16) While Chapman in view of Walters in view of Eskildsen does not explicitly teach splicing fibers with reflective gratings, such fibers are commonly used in the art and could be incorporated in these inventions.

Chapman in view of Walters does not explicitly teach detecting light passing through a spliced region or the specific signal processing employed. It would have been obvious to one of ordinary skill in the art at the time of the invention to employ alignment and analysis systems and methods as taught by Eskildsen in the invention Chapman in view of Walters. One would have been motivated to make such a combination because it would yield an efficient means for fusion splicing optical fibers.

8. Claims 1, 8, 10, 11, 13, 19, 21, 26, 29, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chapman et al. (2003/0223712) in view of Maas et al. (5,157,751), in further view of Walters (6,033,515) in further view of Huang et al. (2005/0117856). Chapman in view of Maas et al. (5,157,751), in further view of Walters teaches a method and apparatus for fusion splicing optical fibers as discussed above.

Huang et al. (2005/0117856) teaches an apparatus and method of splicing optical fibers wherein mechanical and electrical shutters may control the exposure of laser light to a fusion splice region. Huang additionally teaches that a laser may be applied to the fibers so that the fiber ends become soft and are slightly deformed – thus forming a curvature. Huang teaches that this is beneficial for the fusion process. (See e.g. p. 28-37) Huang additionally teaches that visible laser beams may be employed in alignment of fibers in fusion splicing. (See e.g. p. 8)

Chapman in view of Walters does not explicitly teach employing a shutter device to control the laser. It would have been obvious to one of ordinary skill in the art at the time of the invention to employ a shutter device because shutter device are commonly used in the laser art to control laser beams as, for example, taught by Huang in the invention of Chapman in view of Walters because this would allow controlled application of the laser beam. One would have been motivated to do so because it would yield an efficient method and device, for example it would provide protection from inadvertent exposure of the laser.

Chapman in view of Walters does not explicitly teach applying a laser to the fibers to provide a curvature to their distal ends. It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate the splicing techniques such as applying a laser to

the fibers thus providing a curvature to their distal ends. One would have been motivated to do so because it would yield an efficient fusion splice.

Chapman in view of Walters does not explicitly teach employing a visible laser beam during alignment of the fiber splice. It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate an alignment system as taught by Huang, including splitting the visible beam, in the invention of Chapman in view of Walters. One would have been motivated to do so because it would yield an efficient manner for aligning the fibers.

Chapman in view of Walters does not explicitly teach employing a lathe in the fusion process. It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a lathe for rotating the fibers in the invention of Chapman in view of Walters. One would have been motivated to do so because it would yield an efficient manner for aligning the fibers; for example, it would allow uniform heating of the splice region.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James P. Hughes whose telephone number is 571-272-2474. The examiner can normally be reached on Monday - Friday 9am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on 571-272-2415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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